UNPUBLISHED
SURVEY & CONTROL
REPORTS

INTERMOUNTAIN STATION
Central Reference File
No. 3.4163-51

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH ADMINISTRATION
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Project Targhee-Teton Date November 4, 1949 Author T. T. Terrell

SUBJECT—

TITLE

Insect Survey

Mountain Pine Beetle in Lodgepole Pine

Targhee-Teton Project

1949

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By

Forest Insect Laboratory
Coeur d' Alene, Idaho

FILE COPY FOREST INSECT RESEARCH MISSOULA, MONTANA

INDEX NO.—

U. S. GOVERNMENT PRINTING OFFICE 16—47272-1

Insect Survey

Mountain Pine Beetle in Lodgepole Pine

Targhee-Teton Project

1949

An outbreak of the mountain pine beetle in southeastern Idaho and western Wyoming developed in 1945 - 1946 in the extensive lodgepole pine stands south and east of Yellowstone National Park. Parts of the Caribou, Bridger, Targhee, and Teton National Forest as well as Grand Teton National Park and the proposed Jackson Hole National Monument were involved. The infestation covering approximately 200,000 acres is considered a single outbreak and is known as the Targhee-Teton project.

Annual surveys have been made since 1946. Some control work has been done during each of the past three years. A brief summary of the status of the infestation and the work done during the past four years will help to present the picture of this project and will serve to give a better understanding of the tables and text of this report.

1946: Surveys were made on many of the infested areas late in the fall. Data from these surveys supplemented by visual estimates gave a total estimate of 213,000 infested trees on all areas. Most of these infested trees were estimated to be on the Caribou Forest.

1947: Spring control work was undertaken against only that portion of the infestation found on the Targhee and Teton Forests and Teton National Park. Funds available did not permit complete control on the areas undertaken, but 43,000 trees were treated. The treatment of these trees during what is believed to have been a very critical period of this infestation undoubtedly served to hold this infestation in check and helped set the stage for what was to happen the following year. During the fall of 1947 a survey was again made on the Targhee and Teton Forests, parts of the Bridger and Caribou Forests and the Teton Park and Jackson Hole Monument. The data was more complete except for the back areas of the Caribou Forest. An estimate of 105,000 trees was made which included a guess of 5,000 trees along the Snake River face of the Caribou. During late fall about 6,000 trees were treated on the Teton Forest and in Teton Park.

1948: A spring control project was organized on a scale designed to clean up the infestation on all but the Caribou Forest. During the project, including the 1947 fall work, 114,000 infested trees were treated. (prior to the spring of 1948 all trees treated were felled and sprayed on the ground. During the 1948 spring project and all subsequent control was by spraying the trees standing.) The control measures were successful in reducing the infestation by 75 percent.

During the late summer and fall of 1948 a survey was made of all areas including the infested portion of the Caribou. It was found that the infestation on the control areas had been reduced to 28,000 trees. Most of these were on the Targhee forest adjacent to the Caribou. The total infestation including the Caribou Forest was estimated at 67,000 trees. The first signs of decline were noted on the Caribou forest in the Caribou Basin approximately 90 percent of the stand had been killed on several thousand acres. The infestation in this area often thought to be the source of the entire outbreak had run its course.

New areas of virulent infestation were found in northern areas of the Teton Forest and Teton Park. An older infestation in the northern part of the Targhee Forest thought to be a local buildup was also included in the survey area.

1949: Control plans were designed to clean up all areas in what was hoped to be a final effort to control the outbreak and leave little more than spot or maintenance control to follow. However, funds were not made available until it was too late to permit this work to be done. Control on a reduced scale was undertaken on three areas on the Targhee, four areas on the Teton, part of the Caribou and part of Teton Park. Altogether 17,918 trees were treated.

During the period between August 8 and September 19, surveys of parts of Caribou, Targhee, Teton and Bridger Forests were made under the supervision of Mr. Robert Newcomer of the U. S. Forest Service. Assisting Mr. Newcomer as crew leaders were Dale Tanner and Henry Thompson. At the same time a survey was made of the Grand Teton National Park under the supervision of Mr. Verne Bressler of the Park Service. These surveys were financed by the Forest Service and Park Service on their respective areas from insect control deficiency appropriations. Planning and direction of the work was by this laboratofy. The following summary will show the results of the survey.

Summary
Mountain Pine Beetle in Lodgepole Pine
Targhee-Teton Project
1949

Forest	Acres Surveyed	1949 Infestation
Caribou	41,300	6,797
Targhee	298,643	24,278
Teton	102,230	7,600
Bridger	7,250	786
Grand Teton Park and Monument	39,640	11,199
	489,063	50,660

The survey was made by running sample strips one chain wide through the lodgepole pine host type. Infested trees were recorded on these sample strips giving an infested tree per acre figure from which to make the estimate.

In all important areas of known infestation an attempt was made to sample between 4 and 5 percent of the area. For reconnaissance and on lightly infested areas from 1 to 2½ percent was covered. String lines were layed on the strips by the strip runners and these strips were checked at intervals. During the survey 13,405 acres of sample strip were run.

The following tables will present the data and recommendations in more complete detail.

INSECT SURVEY, CARIBOU FOREST 1949

UNIT	NO.	APPROX. ACRES TYPE	1949 ATTACKS PER ACRE	1949 INFESTATION	% CHANGE FROM 1948	ACTION RECOMM'D	REMARKS
North Caribou Basin	1	9800	.04	392	- 90	None	Inf. over except few in head of Bear Cr.
South Caribou Basin	2	6400	.23	1472	- 21	Control	
McCoy Creek	3	5800	.66	3828	- 41	Control	
Bitter's Peak	4	2000	.14	280	- 89	Control	
Trout Creek	5	1500	.07	105	- 60	None	
Jackknife Creek	6	2700	.10	270	- 41	None	
Diamond Flats	7	4000	.01	40	- 100	None	(2587 trees treated
Sheep-Olsen-Kendal	9	1100	.0	0	- 100	None	(spring 1949
Snake River	10	3000	.0	0	- 100	None	
Bear Creek	11	5000	.09	450	- 90	None	
		41,300		6,797			

INSECT SURVEY, GRAND TETON NAT. PARK 1949

UNIT	NO.	APPROX. ACRES TYPE	1949 ATTACKS PER ACRE	1949 INFESTATION	% CHANGE FROM 1948	ACTION RECOMM'D	REMARKS
Signal Mt.	1 & 1A	4100	.37	1517	+ 15	Control	(Partial spring control 1949 1070 trees
Burnt Ridge	2	1800	.53	954	+ 660	"	(treated.
Timbred Island	7	600	.12	72	- 37	"	79 trees treated spring cont.
Black Trail Butte	8	250	1.40	350	+ 180	"	
Jackson Lake	9A	2000	1.12	2240	+ 800	"	
Jackson Lake	9	6000	.16	960	+	"	No. Inf. 1948
Snake River	10	300	.84	252	- 11	"	Spring Control 1949
Moran	11	640	.40	250	+	"	New Inf. none 1948
Hermitage Point	12	12000	.08	960	+	"	" " " "
Lava Creek	13	1600	.23	368		"	" " " "
Jenny Lake	3	700	.12	84	+ 200	"	Some 1949 sp. control
Headquarters	4	2500	.50	1250	+ 76	"	131 trees treated
Windy Point	5	3000	.44	1320	+ 81	"	
J. Y. Ranch	6	4150	.15	622	- 84	"	Spring Cont. on most of area 1335 treated.
		39,640		11,199			

Units 3, 4, 5 are in the Park; unit 6 about half park and half Monument. All other units are in the proposed Jackson Hole Nat. Monument.

INSECT SURVEY, TETON FOREST 1949

UNIT	NO.	APPROX. ACRES TYPE	1949 ATTACKS PER ACRE	1949 INFESTATION	% CHANGE FROM 1948	ACTION RECOMM'D	REMARKS
Wilson Hgh'y North	53	2300	.05	115	- 61	None	Spring control 1949
Wilson Hgh'y South	54	4570	.20	914	- 5	Control	
Mosquito Creek	55	5300	.20	1060	- 16	Control	
Taylor Mt.	56	3860	.08	308	- 63	Control	
Falls Creek	57	7680	.05	384	- 72	None	
Coburn Creek	58	2000	.03	60	- 78	None	
Bailey Creek	59	700	.13	91	0	Control	
Willow Creek	60	2240	.09	202		Control	Inf. in Alder & Up Willow Creek
Buck & Lime Creek	61	500	.0	0	0	None	
Granite Creek	62	3000	.04	120	- 43	None	
Little Horse Creek	63	300	.0	0	- 100	None	Spring Control 1949
Game Cr. & Wilson Can.	64	2500	.16	410	0	Control	.11 per A. Wilson Can. .2 Game Creek
Cache Creek	65	1020	.06	61	- 80	None	Spring Control 1949
Sheep Creek	66	1000	.33	330	+ 266	Control	
Ditch & Turpin Crs.	67	5360	.18	980	- 34	Control	Spring Control 1949
Lost Creek	68	2800	.26	728		Control	Contol Spring 1949
Upper Ditch Cr.	69	2140	.0	0		None	
Horse Tail Creek	70	600	.08	50		Control	
Lower Gros Ventre	71	950	.0	0	- 100	None	Spring Control 129 treated
Slide Lake & Redmond Cr.	72	950	.55	522		Control	Partial Control Spring '49
Slate Cr. & Upper G. Ventre	73	12500	.0	0			313 acres detection strip
Spread Creek	74	6360	.07	445		Control	
Lara Creek	75	1400	.23	322		Control	3000 acres sur. 1600 in Monument
Pacific Cr.	76	2500	.0	0			
Upper Buffalo Riv.	77	4140	.02				Units 68 to 79 are new areas.
Glade Cr.	78	2560	.0				No previous sur. inf. detected
Upper Hoback	79	27000	.03	598		None	during spring control.
		102,230		7,600			

INSECT SURVEY, TARGHEE FOREST 1949

UNIT	NO.	APPROX. ACRES TYPE	1949 ATTACKS PER ACRE	1949 INFESTATION	% CHANGE FROM 1948	ACTION RECOMM'D	REMARKS
Alpine	14	4400	.08	352	- 67	Control	(Inf. on west side sheep & s. side
Burns Canyon	15	600	.35	210	+ 170	Control	(Indian Creek.
Hawley Gulch	16	10500	.22	2310	+ 9	Control	
Hinkley Creek	17	5550	.16	888	- 24	Control	
Muddy Spgs.	18	7680	.08	614	+ 0	Control	
Canyon Creek	19	5064	.28	1418	+ 330	Control	Inf. confined to 1200 A.
Kirkham Hol	20	1096	.30	330	- 25	Control	Spring control about 400 trees
Horseshoe - Pack Saddle	22	9769	.11	1074	+ 450	Control	(Inf. on 1200 A. Be. Superior & Porcupine
Mahogany & Twin Creek	23-24	6370	.08	509	- 18	Control	(Creek.
Henderson - Drake	25	3100	.34	1054	+ 100	Control	
Upper Trail Creek	26	864	.16	138	+ 34	Control	
Lower Trail Creek	27	1800	.07	126	+ 133	Control	
Moose Game & Sweet	28	1150	.07	80	- 80	None	
Little Pine - Nordell	29	5000	.10	500	- 9	Control	
Rainey Creek	30	2200	.19	418	- 5	Control	
North Pine Creek	31	5900	.59	3481	+ 85	Control	
West Pine Creek	32	2000	.32	640	- 32	Control	
Lower Pine Creek	33	800	.06	48	- 57	Control	
Mike Spencer	34	1800	.22	396	- 78	Control	Inf. all near mouth Poison Creek.

TARGHEE CONT.

UNIT	NO.	APPROX. ACRES TYPE	1949 ATTACKS PER ACRE	1949 INFESTATION	% CHANGE FROM 1948	ACTION RECOMM'D	REMARKS
Tie Canyon	35	2800	.68	1904	+ 59	Control	
Dog Creek	36	2000	.02	40	- 67	None	
Cabin Creek	37	1800	.00	0	- 100	None	
Elk Creek	38	3000	.17	510	- 43	Control	Acerage increased treated area shows
Squirrel Creek	39	18000	.12	2160	+ 71	Control	Spot Cont. Spring 1949 (Reduction
Porcupine	40	13000	.10	1300	- 9	Control	" " " "
Falls River	41	14000	.07	980	+ 700	Control	Up from .01 to .07 not significant
Spring Creek	42	600	.29	174	- 48	Control	Cont. area clean. '49 int. in Antelope
Green Canyon	43	5000	.11	550	- 78	Control	(Valley
Bear Canyon	44	3600	.04	144	0	Control	Spot control recommended
Thurman Ridge	45	1200	.10	120	+ 233	Control	" " "
Bishop Mt. Antelope Flats	46	5000	.17	850	+ 240	Control	Most inf. S: of Antelope Flats
Hotel Creek	47	12000	.08	960	- 62	Control	Hot spot control recommended on 8000 acres
Yale - Stamp Meadows	48	10000	.02			None	
Buffalo-Big Spgs.	49	20000	.00			None	
Island Park - Split Cr.	50	36000	.01			None	
Big Bend	51	35000	.02			None	
Osborne-Lower Falls	52	40000	.00			None	
		298,643		24,278			

INSECT SURVEY, BRIDGER FOREST 1949

UNIT	NO.	APPROX. 1949 ACRES TYPE	1949 ATTACKS PER ACRE	1949 INFESTATION	% CHANGE FROM 1948	ACTION RECOMM'D	REMARKS
Greys River	12	6400	.04	256	+ 100	None	
Greys River Salt River Junction	13	600	.05	30			Several small areas
Pinedale		100	3.00	300		Control	Townsite of Pinedale, Wyoming
Pole Creek		150	1.33	200		Control	Pole Cr. from Half Moon Lake to end of type.
		7,250		786			

The 1949 season was apparently unusual in some respects because a very heavy second attack of insects occurred on some areas - not only in the Targhee-Teton Project areas but in Montana and Northern Idaho as well. To date, evidence seems to indicate that this second emergence and attack occurred in the more heavily infested areas to a much greater extent than on the lightly infested areas. In some instances there were increases of over 100 percent above the survey figure. Since the survey was started early in August this additional infestation took place subsequent to the survey on many areas and is not a part of the data presented. We can only estimate the additional infestation from data obtained on 1949 fall control work. As an example it is reported that control measures nearly completed on the North Pine Unit of the Targhee forest found virtually the number of trees estimated - .61 per acre as against .59 estimated. However, in the Lost Creek Unit on the Teton, in a more virulent infestation, the trees treated averaged .7 per acre where the estimate made early in August showed .26, an increase of nearly 300 percent. This area was surveyed by 4.5 percent sampling and a recheck showed that no strip ran as high as the infested trees found during control. It is believed that parent adults caused a greater part of the second attack, supplemented perhaps by flights from other areas.

In order to correct to some extent for additional trees attacked after the survey, it is recommended that control measures be planned on a basis of 30 percent above the total estimates. It is felt that most areas will not show such an increase but in the more heavily infested areas the increase will be greater. From the foregoing tables control measures have been recommended by this laboratory for the treatment of infested trees as shown in the following summary. An additional 30 percent has been added to compensate for a probable increase occurring after the survey work was completed.

Forest Area	Acres	Inf. Trees	Plus 30%
Caribou Forest	14,200	5,580	7,514
Targhee Forest	148,693	24,158	31,405
Teton Forest	37,640	6,362	8,271
Bridger Forest	250	500	650
Teton Park and Monument	39,640	11,199	14,559
	240,423	47,799	62,139

The following remarks concerning units where changes have been made in acreages; where points should be amplified, are offered to give a better understanding of the project.

Caribou National Forest

There is little doubt but that the infestation on the Caribou Forest areas is of longer duration than on the other forested areas except for certain local conditions such as the Hotel Creek and Green Canyon infestations on

the Targhee, and the older infestation in parts of the Grand Teton National Park. Because of the longer period of duration the Caribou infestations is definitely on the decline. In the North Caribou Basin at least 90 percent of the lodgepole pine has been killed in past years. While this decline is marked and gratifying, there is no assurance that it will continue where there is an abundance of host material as there is in units 2, 3, and 4. Control measures of last spring against just such an infestation in units 7, and 9 wiped out or reduced the infestation to a normal status.

Unit 8 at the head of Deer Creek on Diamond Ridge has been dropped.

No infestation was found on the scattered areas of type along the west side of the Snake River. Control work in 1948 cleaned these areas up very well.

In 1948 a very inadequate survey was made of the Bear Creek drainage. Maps did not show the presence of type in the drainage nor was there any available figure as to the acerage of timbered area. Only after survey crews were moved off the Caribou was it discovered that there was infested host type in the drainage. A hurried examination by observation from ridges, an aerial flight and a small acerage of sample gave an estimated 7,500 acres of lodgepole host type heavily infested in spots. Thus the estimate of 1948 was not reliable. A more complete coverage of approximately 3½ percent of the area this year gave a better acerage figure of 5000 acres. The presence of red toped trees everywhere shows the 1948 infestation was indeed severe. Two men worked for a week in the drainage. Their statement, "we saw hundreds of red tops but only 16 new attacks", makes one wonder what happened to the insects. The 90 percent reduction was obtained by using the tree per acre figure obtained in 1948 compared with the per acre figure of this year.

Targhee National Forest

Only two of the many small patches of host type on the Alpine unit were found to be infested to any appreciable extent. On a small area principally in sec. 31, T. 1 N., R. 45 E. west of Sheep Creek, sample strips showed an infestation of .2 per acre. South of Indian Creek mostly outside the forest boundary, in sections 17 and 18, T. 2 S., R. 46 E. sample strips showed an infestation of .25 trees per acre on approximately 200 acres. There will be perhaps 100 to 150 trees to be treated in these areas, and it is suggested that as many more can be treated along the margin of the type between Apline and Swan Valley.

No examinations was made in the vicinity of Palisade Lake where a number of trees were treated in 1948. It is suggested that, in the event of control measures in the lower areas, a small crew again go into that area with pack stock to treat what trees can be found. Treatment in the Burns Canyon area is best done in the same manner where the type is to be found in narrow stringers.

The infestation remained nearly static in the Hawley Gulch, Hinkley Creek, and Muddy Springs Units during 1949. On the lightly infested Muddy Springs area it is thought that aerial spotting late in June should do instead of formal spotting. By waiting until the trees are sufficiently faded it should be possible to spot on aerial photographs, most of the infested trees or at least sufficient numbers of them to make their treatment worth while. Formal spotting of this large area would be very expensive for such a small number of infested trees.

In the Canyon Creek Unit, nearly all the infested trees are above Hilton Creek on the south side of Canyon Creek, where the infestation runs as much as a tree per acre on some areas.

Calamity Creek Units has been dropped from the survey because the type does not seem to be host type. Sample strips in the northern part of the Horseshoe Packsaddle Unit adjacent to the east run through almost identical type and no infestation was found in the area in 1949.

Control work in the Horseshoe Packsaddle Unit can be confined to 1200 acres of type between Superior and Porcupine Creek with some aerial scouting somewhat farther north.

Control in the Mahogany and Twin Creek area should be preceded by aerial spotting. Most of the infested trees are near the mouth of Mahogany Creek canyon and in small groups in the Twin Creek area.

The Henderson-Drake and Upper Trail Creek areas should be covered 100 percent in a final effort to clean up these areas. Lower Trail Creek has most of the infested trees in small groups and can probably be spotted from the air.

All other units in the Victor Front and those in Pine Creek including Rainey Creek should be thoroughly worked.

The Elk Creek drainage partially worked from the Teton side during the spring control job showed a marked reduction where control measures were applied but more infested host type extends down the drainage. The 1949 infestation is farther west. Thorough spotting and treating is recommended.

On the huge Squirrel Creek, Porcupine, and Falls River Units including approximately 45,000 acres, somewhat the same procedure as recommended last year is suggested - aerial scouting with follow-up spotting where aerial observation indicates infested areas. One great difficulty of the above procedure in these units is that there are a few outstanding physical features and it is very difficult to locate infested trees or areas from a plane with any reliable degree of accuracy. If at all possible aerial photographs should be used in such observational work - the infested trees plotted directly on the photograph.

Spring control on the small Spring Creek areas was very successful. Only one area not treated in Antelope Valley is infested. Only a few acres of type in a long narrow stringer need be worked.

"Hot Spot" control is recommended for the Green Canyon, Bear Canyon, Thurman Ridge, Bishop Mt., and Hotel Creek Units. Formal coverage should be directed to the long narrow strip of timber south of Antelope Flats. In the Hotel Creek unit only about 8000 acres of host type was found on the control. This acerage represents the lodgepole pine host type within the 12000 acre area surveyed after open parks and Douglas fir areas are deducted.

Areas 48 to 52 were extensively surveyed for reconnaissance purposes. No more than a normal infestation was recorded on 1398 acres of sample strip in these areas.

Teton National Forest

Where control measures are recommended for areas on the Teton Forest, 100 percent coverage is advised on all areas except possibly the Willow Creek Unit. During the survey of Willow Creek all of the infested trees were found up Alder Creek and up Main Willow Creek including a small area below the old control camp site. The type up Willow Creek is so narrow that formal spotting is difficult. Two or three men could perhaps work more efficiently spotting and treating the infested trees as they work up the creek. The narrow stringer of type extends several miles south.

Fall control has been undertaken in the Lost Creek and perhaps parts of the Spread Creek units. However, the estimate given in this report for the forest includes these areas.

Because of the apparent late attack of insects in the Lost Creek area, mentioned earlier in this report, and the subsequent increase in the numbers of infested trees indicates that later infestation may have spread over more area. In conjunction with spring control, it is suggested that thorough scouting of these upper areas be undertaken, not by aerial observation, but by ground reconnaissance. Late attacks would not be faded enough by late spring to show well from the air.

Bridger National Forest

Data taken on a 2 percent survey of Greys River indicated an increase in 1949. The 1948 survey of the area following the 1948 spring control project was a 4 percent coverage. The 1949 survey was 2 percent. The indicated increase could have resulted from a slight variation in data in such a lightly infested area. The infestation recorded during the past year is only slightly above normal.

During the summer of 1948 infested trees were reported in the Pole Creek drainage east of Pinedale, Wyoming by Ranger S. E. Cazier who made a 100 percent cruise of the drainage and found approximately 250 infested trees.

The host type is but a narrow stringer from 2 to 5 chains wide and extends along the creek from Half Moon Lake for 6 or 7 miles out into the open country. The type also extends around the shore of Half Moon Lake for 20 or 30 chains above the outlet. The country on either side of Pole Creek is barren for considerable distance. Apparently, the infestation is a local build up starting some years back in water damaged trees. About 20 percent of the stand has been killed from water and insects. Most of this area is outside the Forest boundary. Of the estimated 200 infested trees about 50 will be inside the forest boundary and 150 outside. This estimate is made from counts on approximately 50 percent of the area.

Within the city limits of the town of Pinedale, Wyoming there is roughly 100 acres of lodgepole pine host type. During the survey large groups of infested trees were found in the northern part of the village. Counts on as nearly 100 percent of the type north of the highway as could be made at the time totaled 192 infested trees. A few infested trees were found south of the highway but not many. It is estimated that about 300 trees will be found by thorough coverage. Except for a few trees along Pine Creek northeast of town, all the infested trees are within the incorporated limits of Pinedale and are perhaps a problem of the local city government. From an entomological standpoint these infested trees should be treated to protect the lodgepole pine type on the Bridger Forest to the northwest and areas north of Freemont Lake.

In addition to surveys, an aerial reconnaissance was also made of the northern end of the Bridger Forest. Porcupine damaged trees observed examinations in areas adjacent to Freemont Lake, New Forks Lake and along the Green River north as far as Little Sheep Mountain and Mosquito Lake. No infested trees were found in these areas. An examination was made along the north western side of the Green River Valley in several drainages of Beaver Creek and Chall Creek. A very heavy stand of mature lodgepole pine - highly susceptible type was examined in these drainages. Only an occassional infested tree was found.

Grand Teton National Park and Jackson Hole National Monument

For the purposes of surveying Grand Teton Park and the adjacent Monument, strip lines were run on east and west bearing at twenty chain intervals through the entire park and most of the national monument. The work was done by a four man crew who were first trained in the forest service, training camp and then confined their work to the park and monument areas for the rest of the season. The results of this work are believed to be the most complete survey of the area ever accomplished.

Because of the post survey increase in the number of attacks that occurred in the Lost Creek area on the national forest across the valley from the park, it is felt that an increase from late attacks may have occurred in the park and monument areas. Accordingly, it is recommended that control measures be planned to treat at least 30 percent more trees than the estimate.

Control measures are recommended for all park and monument areas. Plans should be made for 100 percent coverage on all areas except the Hermitage Point area where late aerial spotting should be carried out with the infested trees plotted on aerial photograph. Extra copies of aerial photographs should be secured for the work in the Hermitage Point area.

The Lava Creek area was surveyed by a forest service crew in conjunction with their survey of the type in that area on the Forest Reserve.

In addition to the areas surveyed as shown in the tables, 426 acres of sample strip were run between the Hermitage Point area and the Flag Ranch where the highway crosses the Snake River, and 361 acres were run in Yellowstone Park at various intervals between the south entrance and west thumb. In Yellowstone, the strips were taken in areas of mature type and adjacent to the Lewis Lake burn.

No abnormal infestation was recorded in these last two areas. An examination of mature lodgepole pine type in the Barry Creek drainage was made for the first time. Two strips were run in the vicinity of Two Ocean and Emma Matilda Lake. North of Two Ocean Lake 2 infested trees were found. Aerial spotting should be thoroughly done in this area in conjunction with the aerial spotting suggested for the Hermitage Point area.

There is little doubt but that the infestation within the park and monument areas is highly epidemic and that it is year by year working farther north. A few years ago only an occassional infested tree was found in the Signal Mountain Area. During 1948 about 400 trees were treated; in 1949, 1070 trees were treated and now the infestation has reached the 1500 tree mark. Not many more trees per acre are infested but more acres are involved. This infestation is being feed from areas farther south where the infestations has built up like a "slow burn" until the hillsides are gradually turning red. In 1948, 8500 acres of mixed pole and host type around the southern end of Jackson Lake were surveyed. Only a part of this area was then infested - 1500 acres with .16 per acre. This 1500 acre area in 1949 has over a tree per acre and, significantly, the rest of the area has now, .16 infested trees per acre.

In 1948 no infested trees were found north of Moran, Wyoming. In 1949 we have 640 acres east of Moran with an infestation of .4 per acre, 1600 acres in the Lava Creek drainage at .23 per acre and the opening phase of an outbreak on 12,000 acres in the Hermitage Point area of .08 per acre.

Unless the infestation within the park and monument areas is controlled completely and thoroughly the loss of from 80 to 90 percent of the lodgepole type will surely follow, and the steady invasion of thousands of acres of lodgepole stands on the Teton National Forest and Yellowstone National Park to the north and east can be predicted.

A breakdown of man days for the survey on the National Forests is given in the following table:

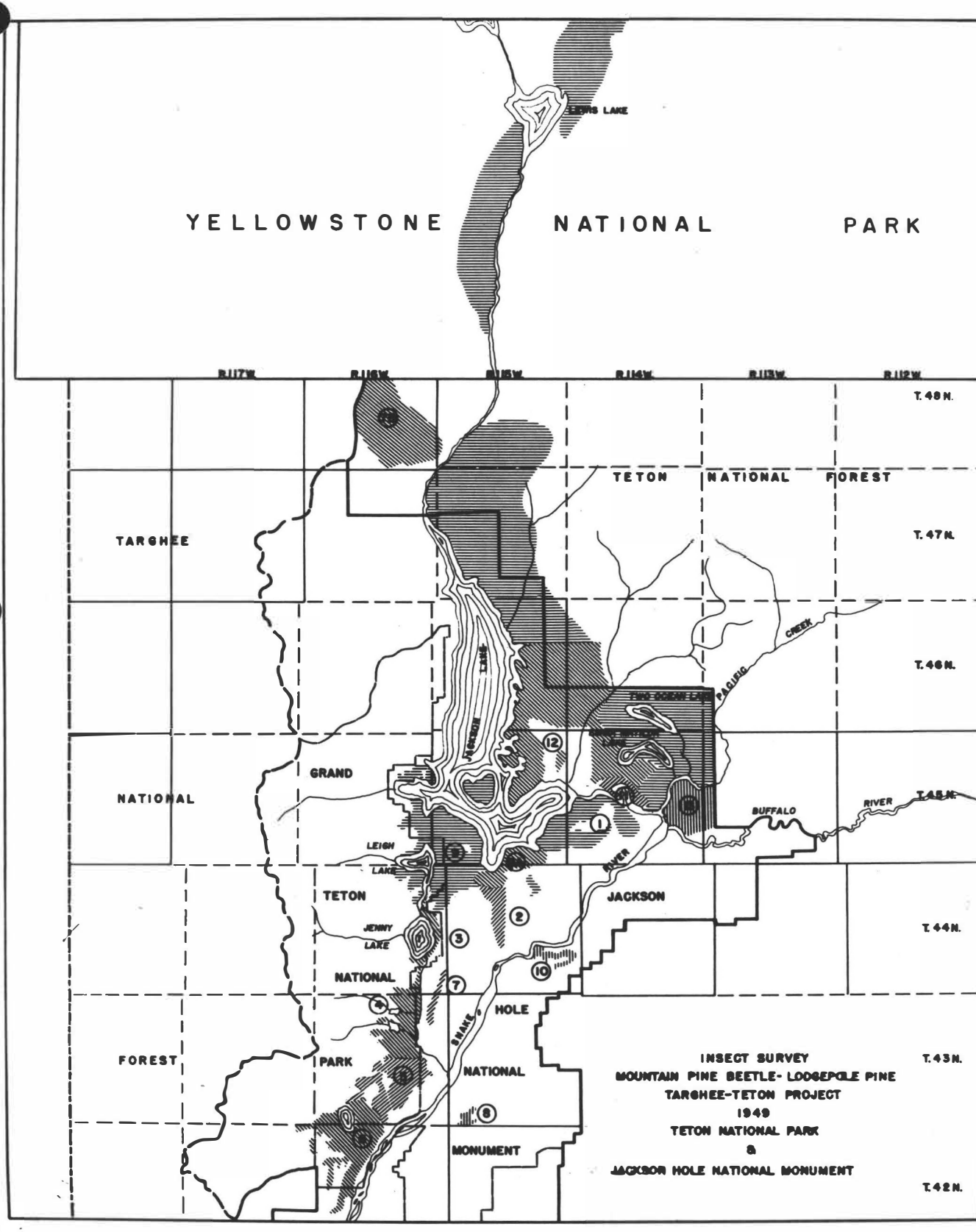
	Man Days
Training	49
Camp Construction and Moving	124
Supervision	92
Annual Leave	53
Sample Strip	453
Scouting	3
TOTAL	774

Mandays in the National Park and Monument areas are approximately:

Training	9
Supervision	17
Annual Leave	10
Sample Strip	84
	120

Because the park crew lived and boarded at the National Park Headquarters they did not have the added burden of moving camp, man days for cooks and supplies.

Cost figures are not available from the Forests and Park Service but an estimate of $14,324.00 should be very close to the funds actually used.


YELLOWSTONE NATIONAL PARK
LEWIS LAKE
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R.113W.
R.112W.
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TETON NATIONAL FOREST
TARGHEE
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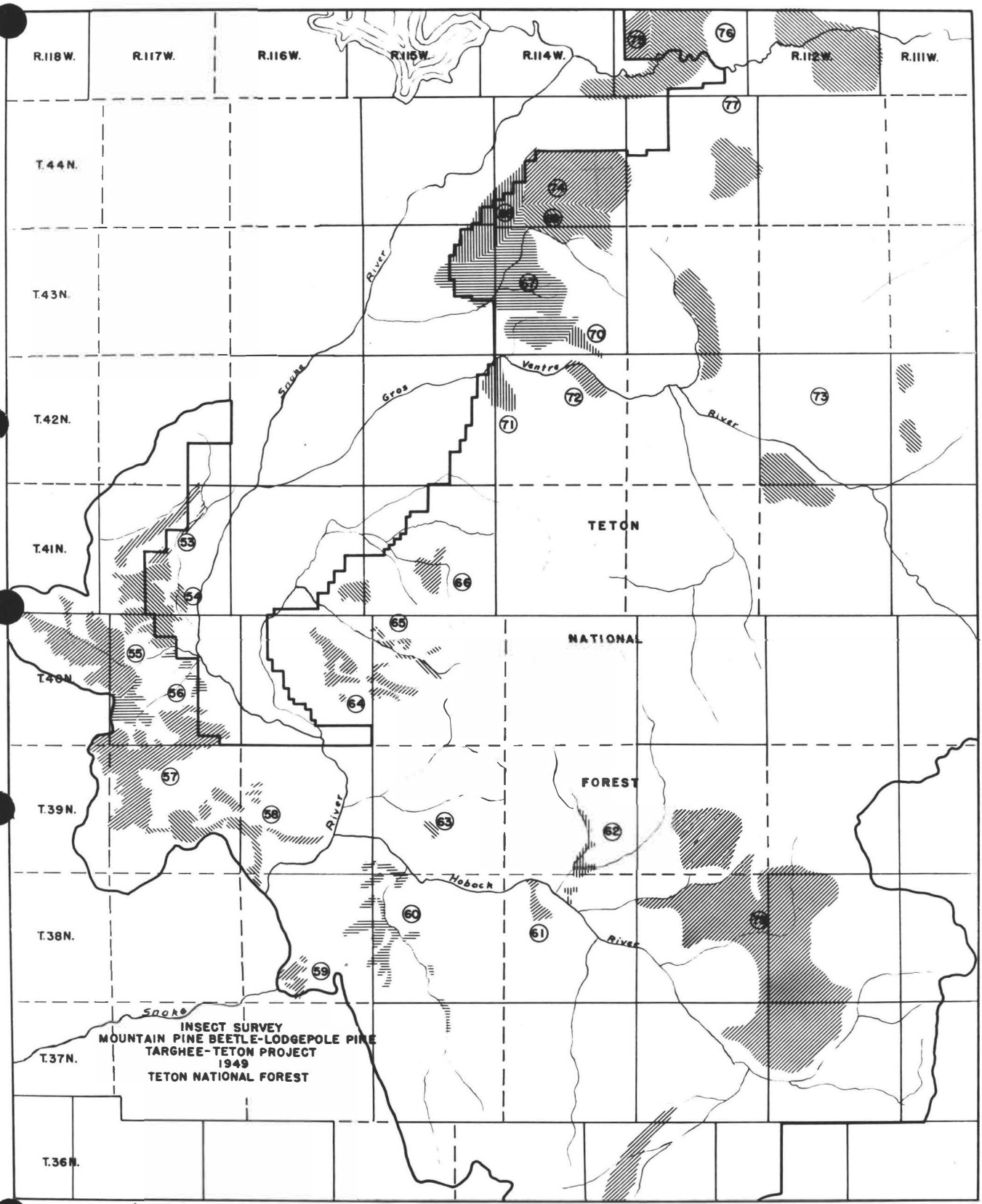
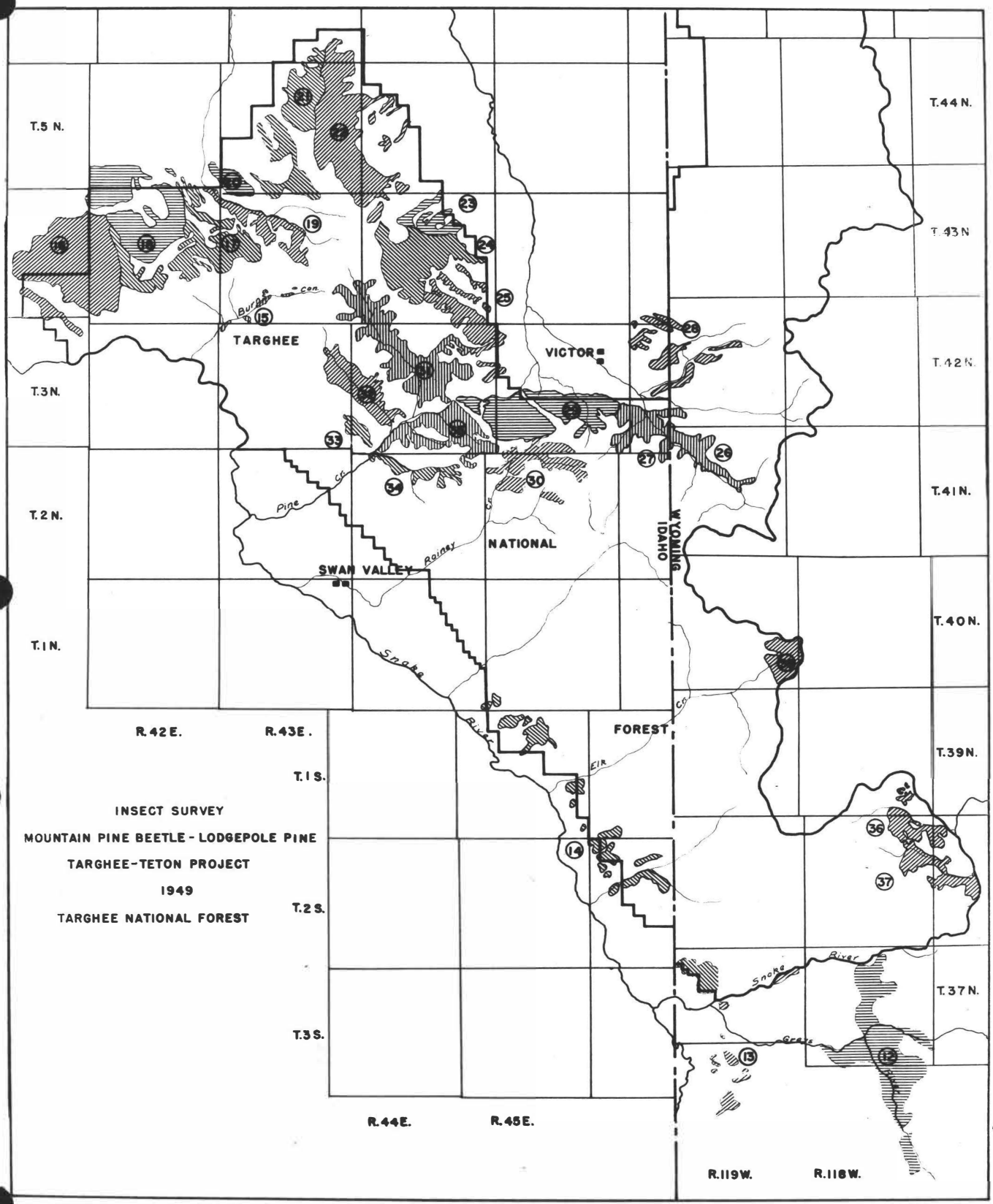
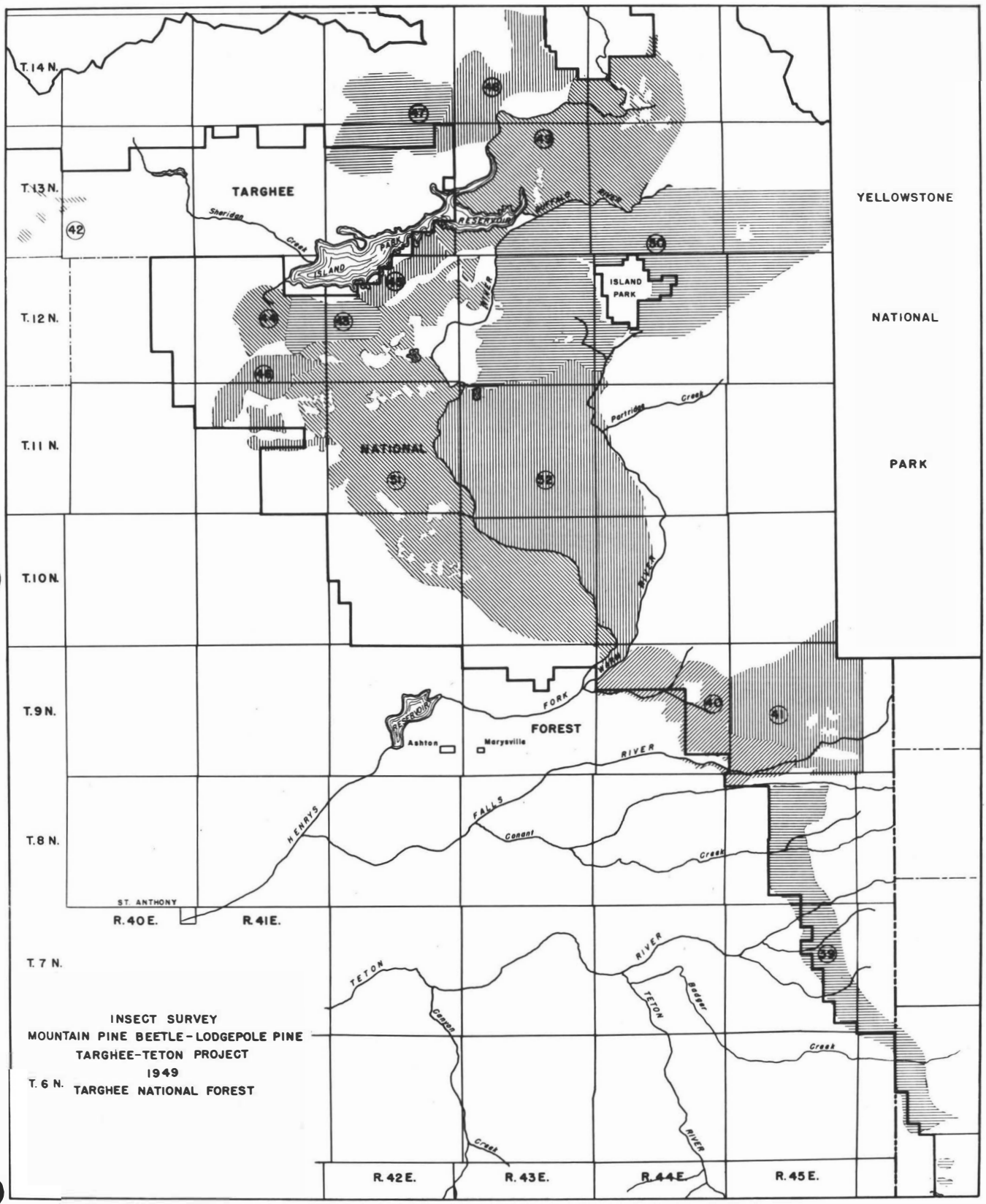
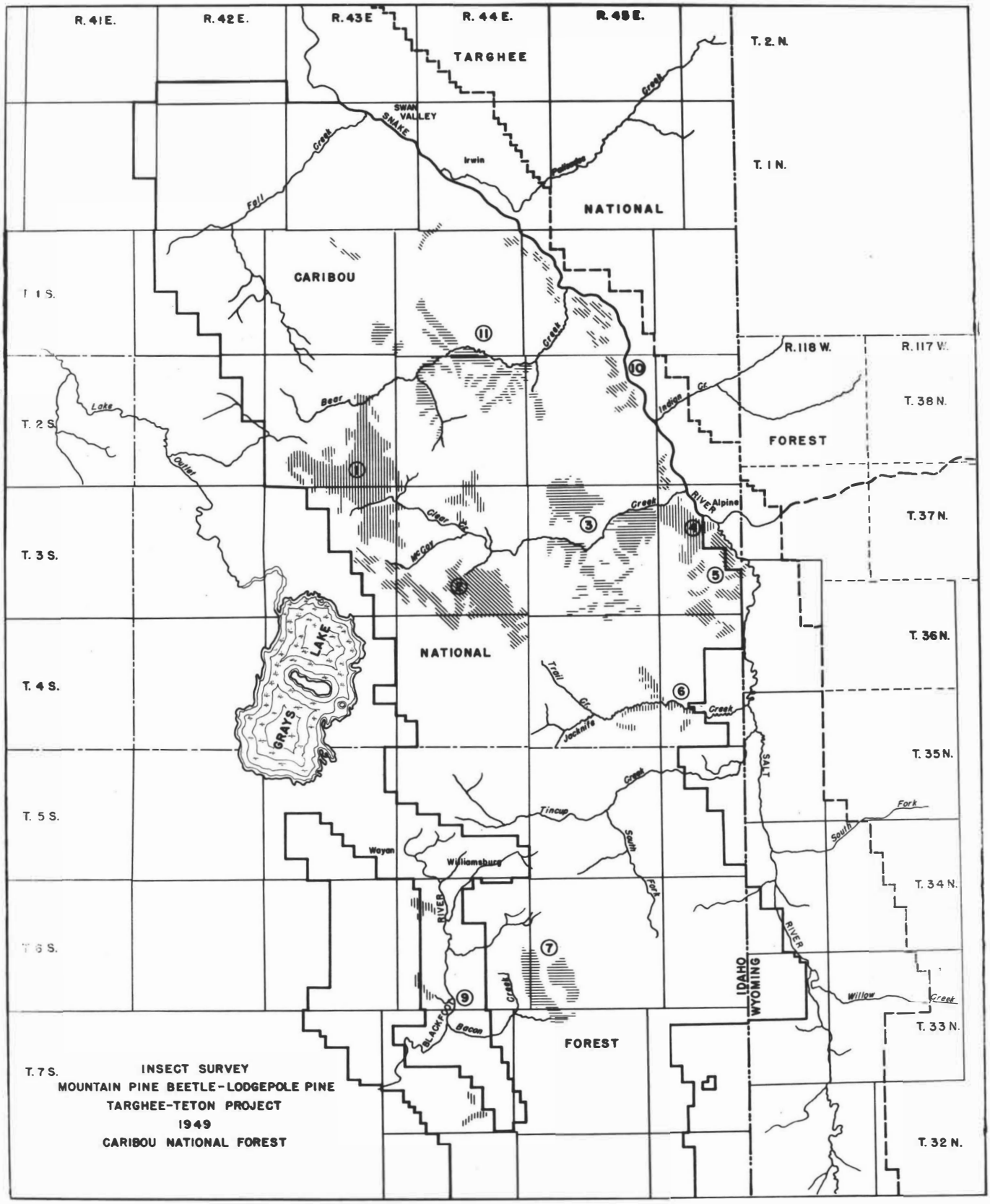
T. 46 N.
PACIFIC CREEK
JACKSON LAKE
GRAND
NATIONAL
BUFFALO
RIVER
T. 45 N.
LEIGH LAKE
SNAKE RIVER
TETON
JACKSON
JENNY LAKE
T. 44 N.
NATIONAL
HOLE
FOREST
PARK
NATIONAL
MONUMENT
INSECT SURVEY
MOUNTAIN PINE BEETLE- LODGEPOLE PINE
TARGHEE-TETON PROJECT
1949
TETON NATIONAL PARK
&
JACKSON HOLE NATIONAL MONUMENT
T. 43 N.
T. 42 N.


R.118W.
R.117W.
R.116W.
R.115W.
R.114W.
R.112W.
R.111W.
T.44N.
T.43N.
T.42N.
T.41N.
T.40N.
T.39N.
T.38N.
T.37N.
T.36N.
Snake River
Gros Ventre River
Hoback River
Snake River
TETON
NATIONAL
FOREST
INSECT SURVEY
MOUNTAIN PINE BEETLE-LODGEPOLE PINE
TARGHEE-TETON PROJECT
1949
TETON NATIONAL FOREST


T.5 N.
T.3N.
T.2 N.
T.1N.
T.1 S.
T.2 S.
T.3 S.
T.44 N.
T.43 N.
T.42 N.
T.41N.
T.40N.
T.39N.
T.37 N.
R.42 E.
R.43E.
R.44E.
R.45E.
R.119W.
R.118W.
TARGHEE
VICTOR
SWAN VALLEY
NATIONAL
FOREST
WYOMING
IDAHO
Pine Cr.
Rainey Cr.
Snake River
Elk Cr.
Snake River
Grays
INSECT SURVEY
MOUNTAIN PINE BEETLE - LODGEPOLE PINE
TARGHEE-TETON PROJECT
1949
TARGHEE NATIONAL FOREST


T. 14 N.
T. 13 N.
T. 12 N.
T. 11 N.
T. 10 N.
T. 9 N.
T. 8 N.
T. 7 N.
T. 6 N.
R. 40 E.
R. 41 E.
R. 42 E.
R. 43 E.
R. 44 E.
R. 45 E.
TARGHEE
NATIONAL
FOREST
YELLOWSTONE
NATIONAL
PARK
ISLAND
PARK
Sheridan
Creek
Partridge
Creek
Ashton
Marysville
ST. ANTHONY
HENRYS
FORK
RIVER
FALLS
RIVER
Conant
Creek
TETON
RIVER
Badger
Creek
Canyon
Creek
TETON
RIVER
INSECT SURVEY
MOUNTAIN PINE BEETLE - LODGEPOLE PINE
TARGHEE-TETON PROJECT
1949
TARGHEE NATIONAL FOREST


R. 41E.
R. 42E.
R. 43E
R. 44E.
R. 45E.
TARGHEE
T. 2. N.
T. 1 N.
SWAN VALLEY
SNAKE
Irwin
Fall
Creek
Pritchard
NATIONAL
CARIBOU
T 1 S.
T. 2 S.
T. 3 S.
T. 4 S.
T 5 S.
T 6 S.
T. 7 S.
R. 118 W.
R. 117 W.
T. 38 N.
FOREST
T. 37 N.
T. 36 N.
T. 35 N.
T. 34 N.
T. 33 N.
T. 32 N.
Lake
Outlet
Bear
Indian Ck.
Cleveland
McCoy
Alpine
River
Trail Ck.
Jackrabbit
Salt
Fork
South
Tincup
Wayan
Williamsburg
Willow
Creek
Blackfoot
Bacon
IDAHO
WYOMING
GRAYS
LAKE
1
2
3
4
5
6
7
9
10
11
INSECT SURVEY
MOUNTAIN PINE BEETLE-LODGEPOLE PINE
TARGHEE-TETON PROJECT
1949
CARIBOU NATIONAL FOREST